

What is claimed is:

1. A method of calculating a parallel efficiency of a parallel computer system, said method comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning a processing time caused by an overhead for parallel processing;

calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using said first information, said second information and said third information; and

calculating a parallel efficiency by using said parallelized rate, said sequential calculation time ratio and said parallel overhead ratio.

2. The method as set forth in claim 1, wherein

said first information concerning the processing time for the portion to be sequentially processed is a number of times it is determined in a confirmation of execution status for each predetermined period during the execution of said parallel processing program, that sequential processing is performed, and

said second information concerning the processing time for the portion to be parallel processed is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that parallel processing is performed, and

said third information concerning the processing time caused by the overhead for the parallel processing is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that processing caused by the overhead for the parallel processing is performed.

3. The method as set forth in claim 1, wherein said first calculating step comprises the steps of:

multiplied a value of said second information by the number of processors to obtain fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

calculating (a value of said fourth information)/(a value of said first information + a value of said fourth information) as said parallelized rate.

4. The method as set forth in claim 1, wherein said first calculating step comprises a step of dividing a value of said first information by a value of information concerning total processing time for said parallel processing program to obtain said sequential calculation time ratio.

5. The method as set forth in claim 1, wherein said first calculating step comprises a step of dividing a value of said third information by a value of information concerning total processing time for said parallel processing program to obtain said parallel overhead ratio.

6. The method as set forth in claim 1, wherein said second calculating step comprises a step of calculating  $((1/(said\ parallelized\ rate)) \times (1-(said\ sequential\ calculation\ time\ ratio)-(said\ parallel\ overhead\ ratio)))$  as said parallel efficiency.

7. The method as set forth in claim 1, further comprising a step of outputting said parallelized rate, said sequential calculation time ratio, said parallel overhead ratio and said parallel efficiency.

8. The method as set forth in claim 1, further comprising a step of analyzing contribution of said parallelized rate, said sequential calculation time ratio, and parallel overhead ratio toward said parallel efficiency.

9. A method of calculating a parallel efficiency of a parallel computer

system, said method comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

multiplying a value of the obtained second information by a number of processors as fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using at least said first information and said second information; and

calculating  $((\text{a value of said first information}) + (\text{a value of said fourth information})) / ((\text{a value of said third information}) \times (\text{said number of processors}))$  as a parallel efficiency.

10. A method of calculating a parallel efficiency of a parallel computer system, said method comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

calculating a parallelized rate by using the obtained first information and the obtained second information; and

calculating a product of an inverse of said parallelized rate, an inverse of a value of said third information and said second information as a parallel efficiency.

11. A program embodied on a medium, for causing a computer to calculate a parallel efficiency of a parallel computer system, said program

comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning a processing time caused by an overhead for parallel processing;

calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using said first information, said second information and said third information; and

calculating a parallel efficiency by using said parallelized rate, said sequential calculation time ratio and said parallel overhead ratio.

12. The program as set forth in claim 11, wherein

said first information concerning the processing time for the portion to be sequentially processed is a number of times it is determined in a confirmation of execution status for each predetermined period during the execution of said parallel processing program, that sequential processing is performed, and

said second information concerning the processing time for the portion to be parallel processed is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that parallel processing is performed, and

said third information concerning the processing time caused by the overhead for the parallel processing is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that processing caused by the overhead for the parallel processing is performed.

13. The program as set forth in claim 11, wherein said first calculating step comprises the steps of:

multiplying a value of said second information by the number of

processors to obtain fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

calculating (a value of said fourth information)/(a value of said first information + a value of said fourth information) as said parallelized rate.

14. The program as set forth in claim 11, wherein said first calculating step comprises a step of dividing a value of said first information by a value of information concerning total processing time for said parallel processing program to obtain said sequential calculation time ratio.

15. The program as set forth in claim 11, wherein said first calculating step comprises a step of dividing a value of said third information by a value of information concerning total processing time for said parallel processing program to obtain said parallel overhead ratio.

16. The method as set forth in claim 11, wherein said second calculating step comprises a step of calculating  $((1/(said\ parallelized\ rate)) \times (1-(said\ sequential\ calculation\ time\ ratio)-(said\ parallel\ overhead\ ratio)))$  as said parallel efficiency.

17. The program as set forth in claim 11, further comprising a step of outputting said parallelized rate, said sequential calculation time ratio, said parallel overhead ratio and said parallel efficiency.

18. The program as set forth in claim 11, further comprising a step of analyzing contribution of said parallelized rate, said sequential calculation time ratio, and parallel overhead ratio toward said parallel efficiency.

19. A program embodied on a medium, for causing a computer to calculate a parallel efficiency of a parallel computer system, said program comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

multiplied a value of the obtained second information by a number of processors as fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using at least said first information and said second information; and

calculating ((a value of said first information) + (a value of said fourth information))/((a value of said third information) x (said number of processors)) as a parallel efficiency.

20. A program embodied on a medium, for causing a computer to calculate a parallel efficiency of a parallel computer system, said program comprising the steps of:

obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

calculating a parallelized rate by using the obtained first information and the obtained second information; and

calculating a product of an inverse of said parallelized rate, an inverse of a value of said third information and said second information as a parallel efficiency.

21. An apparatus for calculating a parallel efficiency of a parallel computer system, comprising:

means for obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning a processing time caused by an overhead for parallel processing;

a first calculator for calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using said first information, said second information and said third information; and

a second calculator for calculating a parallel efficiency by using said parallelized rate, said sequential calculation time ratio and said parallel overhead ratio.

22. The apparatus as set forth in claim 21, wherein

said first information concerning the processing time for the portion to be sequentially processed is a number of times it is determined in a confirmation of execution status for each predetermined period during the execution of said parallel processing program, that sequential processing is performed, and

said second information concerning the processing time for the portion to be parallel processed is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that parallel processing is performed, and

said third information concerning the processing time caused by the overhead for the parallel processing is a number of times it is determined in the confirmation of the execution status for each predetermined period during the execution of said parallel processing program, that processing caused by the overhead for the parallel processing is performed.

23. The apparatus as set forth in claim 21, wherein said first calculator comprises:

a multiplier for multiplying a value of said second information by the number of processors to obtain fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

a calculator for calculating (a value of said fourth information)/(a value of said first information + a value of said fourth information) as said parallelized rate.

24. The apparatus as set forth in claim 21, wherein said first calculator comprises a divider for dividing a value of said first information by a value of information concerning total processing time for said parallel processing program to obtain said sequential calculation time ratio.

25. The apparatus as set forth in claim 21, wherein said first calculator comprises a divider for dividing a value of said third information by a value of information concerning total processing time for said parallel processing program to obtain said parallel overhead ratio.

26. The apparatus as set forth in claim 21, wherein said second calculator comprises a calculator for calculating  $((1/(said\ parallelized\ rate)) \times (1-(said\ sequential\ calculation\ time\ ratio)) - (said\ parallel\ overhead\ ratio))$  as said parallel efficiency.

27. The apparatus as set forth in claim 21, further comprising an output device for outputting said parallelized rate, said sequential calculation time ratio, said parallel overhead ratio and said parallel efficiency.

28. The apparatus as set forth in claim 21, further comprising an analyzer for analyzing contribution of said parallelized rate, said sequential calculation time ratio, and parallel overhead ratio toward said parallel efficiency.

29. An apparatus for calculating a parallel efficiency of a parallel computer system, comprising:

means for obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

a multiplier for multiplying a value of the obtained second information by a number of processors as fourth information concerning a processing time in sequential processing for the portion to be parallel processed during the execution of said parallel processing program; and

a first calculator for calculating a parallelized rate, a sequential calculation time ratio and a parallel overhead ratio by using at least said first information and said second information; and

a second calculator for calculating  $((\text{a value of said first information}) + (\text{a value of said fourth information})) / ((\text{a value of said third information}) \times (\text{said number of processors}))$  as a parallel efficiency.

30. An apparatus for calculating a parallel efficiency of a parallel computer system, comprising:

means for obtaining first information concerning a processing time for a portion to be sequentially processed during an execution of a parallel processing program, second information concerning a processing time for a portion to be parallel processed during the execution of said parallel processing program and third information concerning total processing time for said parallel processing program;

a first calculator for calculating a parallelized rate by using the obtained first information and the obtained second information; and

a second calculator for calculating a product of an inverse of said parallelized rate, an inverse of a value of said third information and said second information as a parallel efficiency.